Van Harten
SURVEYING INC.
LAND SURVEYORS and ENGINEERS

January 15, 2020
27301-19

Shirewood Centre Inc.
472541 County Road 11
Amaranth, Ontario
L9W 0R3

Attention: Gary Grant

Dear Sir:

Re: Stormwater Brief
1 Victoria Road
Part of Block A, Registered Plan CAL-5
Town of Caledon, Ontario

Van Harten is pleased to submit this Stormwater Brief to accompany a Lot Grading Plan recently completed for the above referenced site, located on King Street between Agnes Street and Victoria Street in the Village of Alton, as indicated on the Key Map of Appendix A. This work was authorized by Mr. Gary Grant of Shirewood Centre Inc.

The project involves the proposed severance of an existing property into three individual lots. The existing privately serviced single family home is to be demolished in order to facilitate the construction of three single family dwellings. The purpose of this letter is to outline the grading and stormwater management approach taken in the design and to discuss existing and proposed drainage patterns.

The pre- and post- development conditions were analyzed in order to observe the effect the proposed construction will have on the stormwater runoff characteristics at the subject property. Runoff coefficients for the site were derived as a weighted average referencing Town of Caledon Standard Drawing 103. Runoff coefficients for all impervious areas were calculated assuming C = 0.90 and all pervious areas as C = 0.25. The intensity of the 2-, 5-, 25- and 100-year design storms were generated using the rational method with IDF curves obtained from Town of Caledon Standard Drawing 103. Inlet times are assumed to be 10 minutes. These parameters are summarized in the following table:

Parameter	2-Year Storm	5-Year Storm	25-Year Storm	100-Year Storm
a	**1070**	**1593**	**3158**	**4688**
b	**7.85**	**11**	**15**	**17**
c	**0.8759**	**0.8789**	**0.9335**	**0.9624**

572 Weber Street North, Unit 7
Waterloo ON N2L 5C6
519-742-8371

423 Woolwich Street
Guelph, ON N1H 3X3
519-821-2763

660 Riddell Road, Unit 1
Orangeville, ON L9W 5G5
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R.P. Magahay, B.A. **J.E. Buisman**, B.E.S., B.Sc., O.L.S. **R.M. Mak**, B.Sc., O.L.S. **J.M. Laws**, B.Sc., O.L.S. **J.M. Duffy**, P.Eng.

Referring to Appendix B, the site as it currently exists is divided into two catchments, referred to here as Catchment 1 and Catchment 2. Catchment 1 comprises of the northwest portion of the property that currently drains towards Agnes Street. Catchment 2 will comprise the south east portion of the property, draining towards Victoria Street.

As illustrated in the Post-Development Catchment Sketch found in Appendix B, the site will continue to generally act as two catchments, referred to here as Catchment 101 and Catchment 102. Catchment 101 comprises Lot 1 and approximately half of Lot 2, and will drain towards Agnes Street, similar to the existing conditions noted in Catchment 1. Catchment 102 will comprise Lot 3 and the remainder of Lot 2 and will drain towards Victoria Street as per the existing conditions noted in Catchment 2. Details of the existing and proposed catchments are as follows:

9 Victoria Street				
Catchment	Area (m^2)	Impervious Area (m^2)	% Impervious	Runoff Coefficient
1	1,000	136	13.6	0.34
2	1,073	147	13.7	0.34
Pre Total	**2,073**	**283**	**13.7**	**0.34**
101	850	277	32.6	0.46
102	1,223	246	20.1	0.38
Post Total	**2,073**	**523**	**25.2**	**0.41**

Attached as Appendix C are calculations relating to the runoff characteristics of the site before and following development. A summary of the runoff rates are as follows:

	To Agnes Street (m^3/sec)		To Victoria Street (m^3/sec)	
	Pre-Development	Post-Development	Pre-Development	Post-Development
2-Year Storm	**0.008**	**0.009**	**0.009**	**0.011**
5-Year Storm	**0.010**	**0.012**	**0.011**	**0.014**
25-Year Storm	**0.015**	**0.017**	**0.016**	**0.020**
100-Year Storm	**0.019**	**0.022**	**0.020**	**0.026**

As noted above, a small amount of increased runoff is anticipated following the development of these properties. It is noted the runoff coefficients calculated above are relatively conservative, as it is understood the proposed site plan will require several zoning amendments to allow for development of the dwellings as described. Also, further increase in impervious area through the construction of rear yard patios or pools is unlikely due to the need to service these lots with on-site sewage systems, which will likely encompass most of the rear yard of each lot. Generally speaking, the largest increase in post development runoff in any direction from the subject property will be towards Victoria Street during the 100-year storm. As noted, an increase in the runoff rate from 0.020 to 0.026 m^3/second is anticipated

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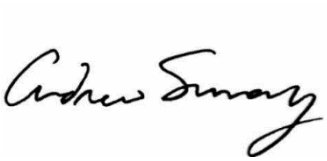
(approximately 6 L/second, or 30% increased runoff), which is relatively minimal considering the overall catchment area draining to Victoria Street. Overall, the proposed development would appear to have a negligible impact on runoff characteristics from the site directed to the municipal roadways.

The completed stormwater brief is specific to the subject property based on our knowledge of the proposed development. Please contact our office if you have any questions or require further consultation.

Van Harten Surveying Inc.

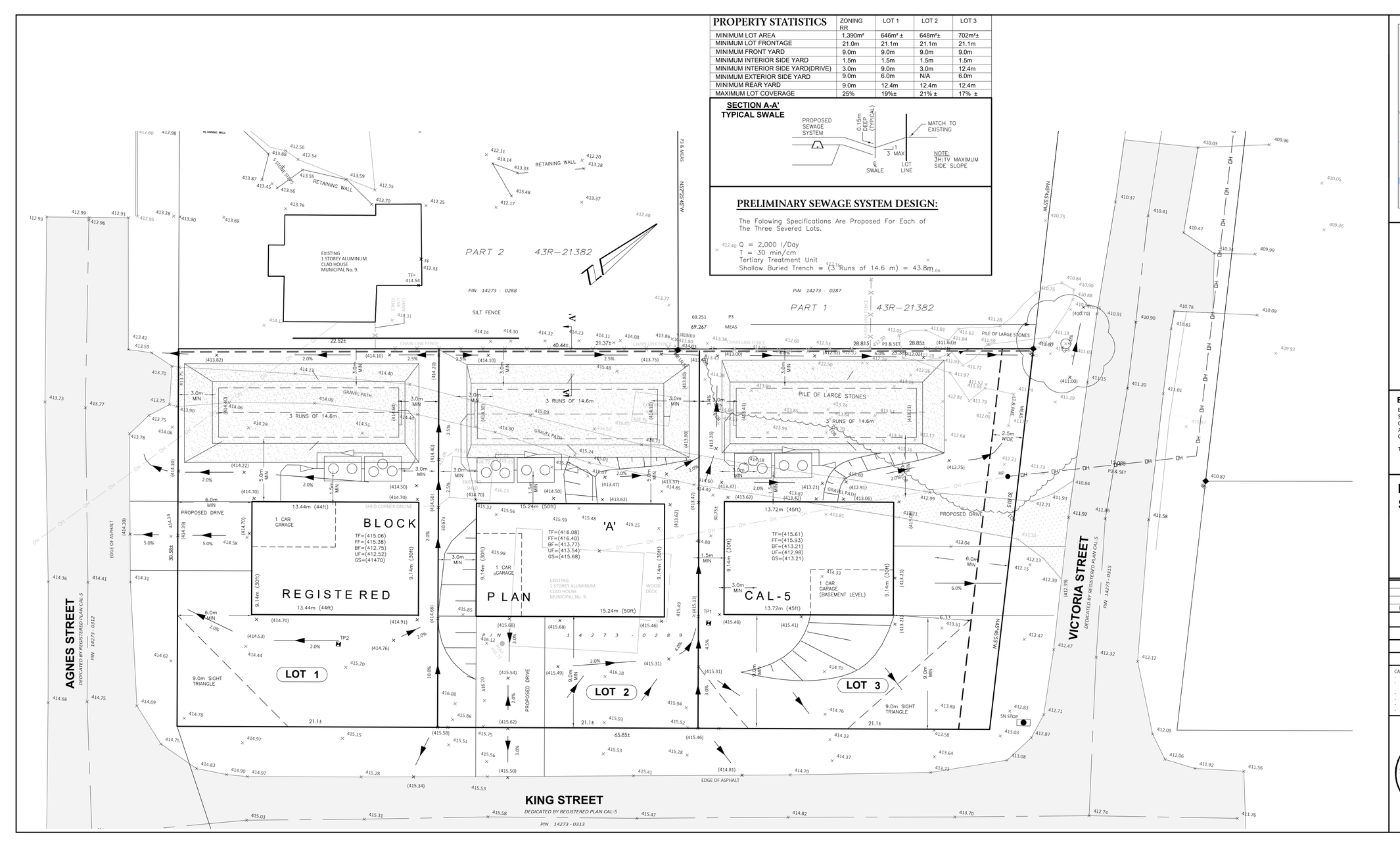


Andrew Sumary, EIT
Junior Engineer

Mike Vaughan, P. Eng.
Professional Engineer

Encl. Appendix A – Site Grading and Servicing Plan
Encl. Appendix B – Pre- and Post-Development Catchment Sketches
Encl. Appendix C – Stormwater Runoff Calculations

APPENDIX A
SITE GRADING AND SERVICING PLAN


PROPERTY STATISTICS
ZONING RR
LOT 1
LOT 2
LOT 3
MINIMUM LOT AREA 1,390m² 646m² ± 648m²± 702m²±
MINIMUM LOT FRONTAGE 21.0m 21.1m 21.1m 21.1m
MINIMUM FRONT YARD 9.0m 9.0m 9.0m 9.0m
MINIMUM INTERIOR SIDE YARD 1.5m 1.5m 1.5m 1.5m
MINIMUM INTERIOR SIDE YARD(DRIVE) 3.0m 9.0m 3.0m 12.4m
MINIMUM EXTERIOR SIDE YARD 9.0m 6.0m N/A 6.0m
MINIMUM REAR YARD 9.0m 12.4m 12.4m 12.4m
MAXIMUM LOT COVERAGE 25% 19%± 21% ± 17% ±
SECTION A-A'
TYPICAL SWALE
PROPOSED SEWAGE SYSTEM
0.15m MIN. (TYPICAL)
MATCH TO EXISTING
3 MAX
SWALE
LOT LINE
NOTE: 3H:1V MAXIMUM SIDE SLOPE
PRELIMINARY SEWAGE SYSTEM DESIGN:
The Folowing Specifications Are Proposed For Each of The Three Severed Lots.
Q = 2,000 l/Day
T = 30 min/cm
Tertiary Treatment Unit
Shallow Buried Trench = (3 Runs of 14.6 m) = 43.8m
PART 2 43R-21382
PIN 14273 - 0288
PART 1 43R-21382
PIN 14273 - 0287
EXISTING 1 STOREY ALUMINUM CLAD HOUSE MUNICIPAL No. 9.
SILT FENCE
RETAINING WALL
STONE STEPS
CHAIN LINK FENCE
WOOD DECK
PILE OF LARGE STONES
3 RUNS OF 14.6m
GRAVEL PATH
PROPOSED DRIVE
1 CAR GARAGE
1 CAR GARAGE (BASEMENT LEVEL)
BLOCK A
REGISTERED PLAN CAL-5
TOWN OF CALEDON
TF=(415.06) FF=(415.38) BF=(412.75) UF=(412.52) GS=(41470)
TF=(416.08) FF=(416.40) BF=(413.77) UF=(413.54) GS=(415.68)
TF=(415.61) FF=(415.93) BF=(413.21) UF=(412.98) GS=(413.21)
LOT 1
LOT 2
LOT 3
9.0m SIGHT TRIANGLE
AGNES STREET
DEDICATED BY REGISTERED PLAN CAL-5
PIN 14273 - 0312
VICTORIA STREET
DEDICATED BY REGISTERED PLAN CAL-5
PIN 14273 - 0315
KING STREET
DEDICATED BY REGISTERED PLAN CAL-5
PIN 14273 - 0313
EDGE OF ASPHALT
SHED CORNER ONLINE
EXISTING 1 STOREY ALUMINUM CLAD HOUSE MUNICIPAL No. 9.
WOOD DECK
SN STOP
HP
P3 & SET
TP1
TP2
KEY MAP
(N.T.S)
SUBJECT PROPERTY
LEGEND:
(395,70) PROPOSED ELEVATION
394.82 EXISTING ELEVATION
FF 412.33 EXISTING FINISHED FLOOR ELEVATION
SLOPE
DIRECTION OF FLOW
SILT FENCE
FENCELINE
OVERHEAD HYDRO
HYDRO POLE
HP
TREELINE
TP1 - TEST PIT
- ASPHALT
- SAND
- GRAVEL
BENCHMARK:
ELEVATIONS ARE BASED ON GPS OBSERVATIONS FROM PERMANENT REFERENCE STATIONS IN THE NAD83 (CSRS-2010) COORDINATE SYSTEM, WITH HEIGHTS CONVERTED TO ORTHOMETRIC ELEVATIONS ON THE CVGD28 DATUM (1978 ADJUSTMENT) WITH GEOID MODEL HTv2.0, AS SUPPLIED BY NATURAL RESOURCES CANADA.
TEMPORARY BENCH MARK: NAIL IN HYDRO POLE 412.43m.
PRELIMINARY GRADING PLAN AND SEVERANCE SKETCH FOR:
PART OF BLOCK A,
REGISTERED PLAN CAL-5
TOWN OF CALEDON
REGIONAL MUNICIPALITY OF PEEL
NO. REVISION BY DATE
2. UPDATED DWELLING CONFIGURATION AS 2020-JAN-15
1. INITIAL SUBMISSION AS 2019-SEPT-23
DRAWING REVISION SCHEDULE
PREPARED FOR: SHIREWOOD CENTRE INC
PROJECT No. 27301-19
DRAWING SCALE: 1:150
CAUTION:
- THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED FOR TRANSACTION OR MORTGAGE PURPOSES
- IT IS THE BUILDER'S RESPONSIBILITY TO ENSURE THE PROPOSED FOOTING ELEVATION AND PLUMBING ALLOWS GRAVITY CONNECTION TO THE SEWAGE SYSTEM.
- THIS LOT MAY CONTAIN STRUCTURAL OR NON-STRUCTURAL FILL PLACED DURING SUBDIVISION GRADING OPERATIONS.
- SOIL BEARING CAPACITY SHOULD BE VERIFIED AT THE TIME OF CONSTRUCTION.
- THE BUILDER MUST ENSURE A MINIMUM OF 1.22m OF EARTH COVER OVER THE FOOTINGS FOR FROST PROTECTION.
- THIS SKETCH IS PROTECTED BY COPYRIGHT
LICENSED PROFESSIONAL ENGINEER
M.A.M. VAUGHAN
100135983
JAN-15-20
PROVINCE OF ONTARIO
Van Harten SURVEYING INC.
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Orangeville Ph: 519-940-4110
www.vanharten.com info@vanharten.com
DRAWN BY: FCF DESIGN BY: AS CHECKED BY: MAMV
Jan 15,2020-12:50pm
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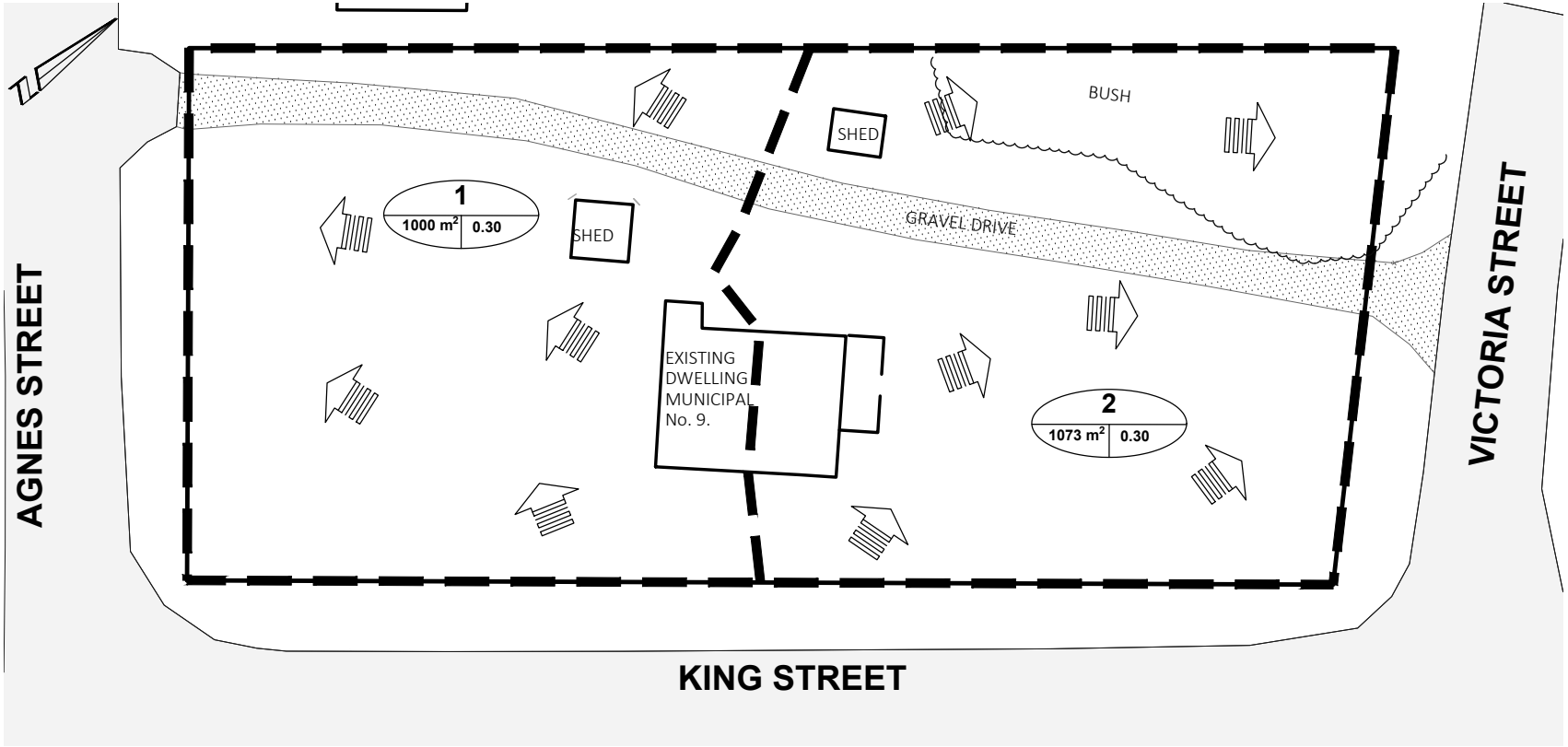
APPENDIX B
PRE- AND POST- DEVELOPMENT CATCHMENT SKETCHES



SCALE 1 : 400

0 5 10 20 metres

VAN HARTEN SURVEYING INC.

PRE DEVELOPMENT SKETCH
PART OF BLOCK A, REGISTERED PLAN CAL-5
TOWN OF CALEDON

LEGEND:

CATCHMENT 101 (AREA 0.25ha | RUNOFF COEFFICIENT 0.75)

DRAINAGE AREA BOUNDARY

MAJOR STORM OVERLAND FLOW ROUTE

ASPHALT

GRAVEL

CONCRETE

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PROJECT NO.: 27301-19	DESIGN BY: AS	CHECKED BY: MMAV

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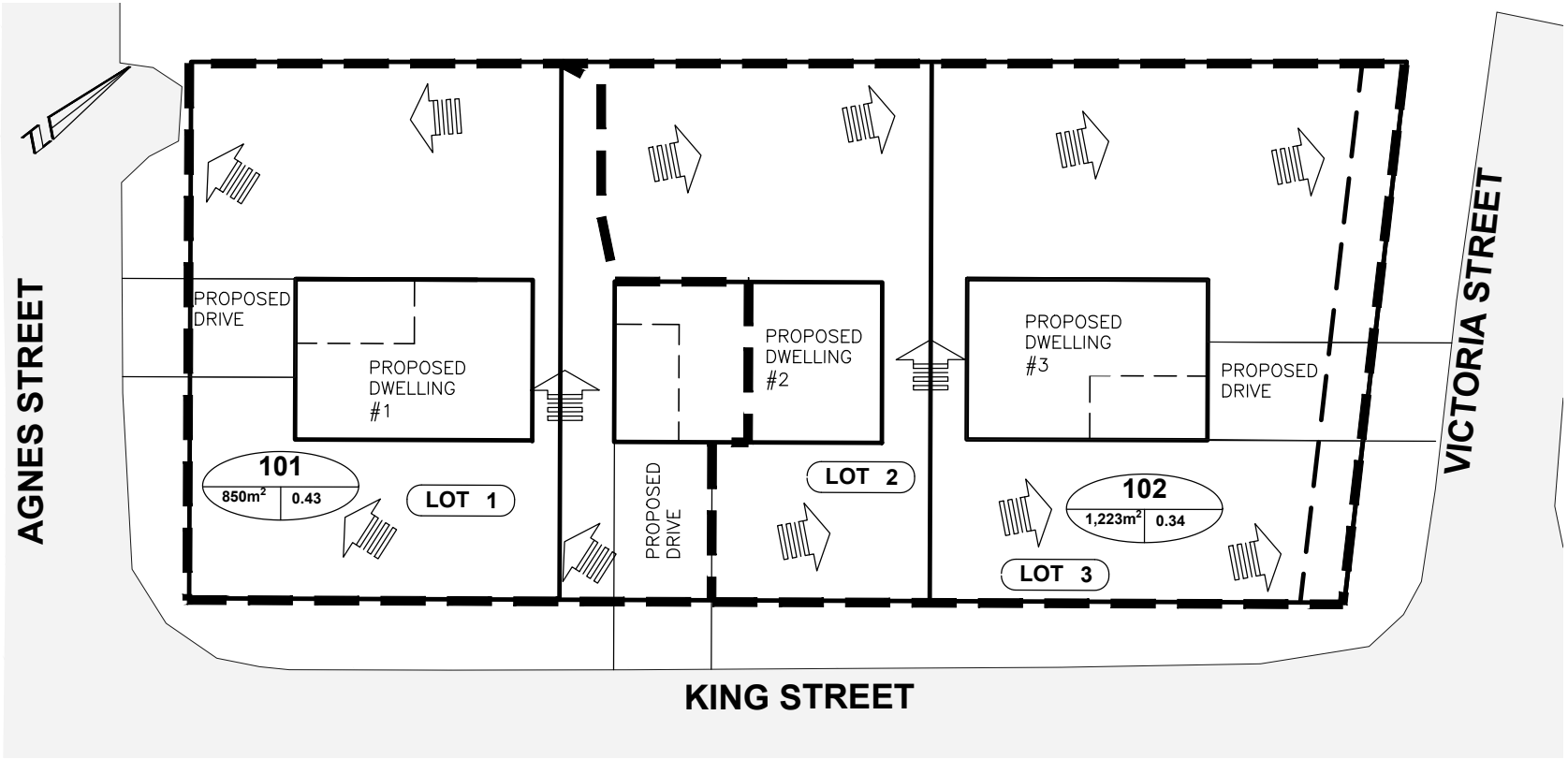

SCALE 1 : 400

0 5 10 20 metres

VAN HARTEN SURVEYING INC.

POST DEVELOPMENT SKETCH
PART OF BLOCK A,
REGISTERED PLAN CAL-5
TOWN OF CALEDON

LEGEND:

CATCHMENT
101
AREA 0.25ha | 0.75 RUNOFF COEFFICIENT

DRAINAGE AREA BOUNDARY

ASPHALT

GRAVEL

MAJOR STORM OVERLAND FLOW ROUTE

CONCRETE

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PROJECT NO.: 27301-19	DESIGN BY: AS	CHECKED BY: MMAV

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APPENDIX C
STORMWATER RUNOFF CALCULATIONS

2 Year Storm Design							
SHIREWOOD (27301-19)							
	Flow Characteristics						
Catchment	**Area (m^2)**	**Impervious Area (m^2)**	**% Impervious**	**Runoff Coefficient**	**Time of Conc. (min)**	**Intensity (mm/hr)**	**Flow Rate (m^3/s)**
1	1,000	136	13.6%	0.34	10.00	85.72	0.008
2	1,073	147	13.7%	0.34	10.00	85.72	0.009
Pre total	**2,073**	**283**	**13.7%**	0.34	**10.00**	85.72	**0.017**
101	850	277	32.6%	0.46	10.00	85.72	0.009
102	1,223	246	20.1%	0.38	10.00	85.72	0.011
Post Total	**2,073**	**523**	**25.2%**	0.41	**10.00**	85.72	**0.021**

2 Year Storm Design Parameters	
A=	1070.000
B=	7.850
C=	0.876
Intensity=	$A/(t+B)^C$
Q=	kCiA
k=	0.0028

Impervious Area C = 0.90
Pervious Area C = 0.25

5 Year Storm Design							
SHIREWOOD (27301-19)							
	Flow Characteristics						
Catchment	**Area (m^2)**	**Impervious Area (m^2)**	**% Impervious**	**Runoff Coefficient**	**Time of Conc. (min)**	**Intensity (mm/hr)**	**Flow (m^3/s)**
1	1,000	136	13.6%	0.34	10.00	109.68	0.010
2	1,073	147	13.7%	0.34	10.00	109.68	0.011
Pre total	**2,073**	**283**	**13.7%**	0.34	**10.00**	**109.68**	**0.022**
101	850	277	32.6%	0.46	10.00	109.68	0.012
102	1,223	246	20.1%	0.38	10.00	109.68	0.014
Post Total	**2,073**	**523**	**25.2%**	0.41	**10.00**	109.68	**0.026**

5 Year Storm Design Parameters	
A=	1593.000
B=	11.000
C=	0.879
Intensity=	$A/(t+B)^C$
Q=	kCiA
k=	0.0028

Impervious Area C = 0.90
Pervious Area C = 0.25

25 Year Storm Design							
SHIREWOOD (27301-19)							
	Flow Characteristics						
Catchment	**Area (m^2)**	**Impervious Area (m^2)**	**% Impervious**	**Runoff Coefficient**	**Time of Conc. (min)**	**Intensity (mm/hr)**	**Flow (m^3/s)**
1	1,000	136	13.6%	0.34	10.00	156.47	0.015
2	1,073	147	13.7%	0.34	10.00	156.47	0.016
Pre total	**2,073**	**283**	**13.7%**	0.34	**10.00**	156.47	**0.031**
101	850	277	32.6%	0.46	10.00	156.47	0.017
102	1,223	246	20.1%	0.38	10.00	156.47	0.020
Post Total	**2,073**	**523**	**25.2%**	0.41	**10.00**	156.47	**0.038**

25 Year Storm Design Parameters	
A=	3158.000
B=	15.000
C=	0.934
Intensity=	$A/(t+B)^C$
Q=	kCiA
k=	0.0028

Impervious Area C = 0.90
Pervious Area C = 0.25

100 Year Storm Design							
SHIREWOOD (27301-19)							
	Flow Characteristics						
Catchment	**Area (m^2)**	**Impervious Area (m^2)**	**% Impervious**	**Runoff Coefficient**	**Time of Conc. (min)**	**Intensity (mm/hr)**	**Flow (m^3/s)**
1	1,000	136	13.6%	0.34	10.00	196.54	0.019
2	1,073	147	13.7%	0.34	10.00	196.54	0.020
Pre total	**2,073**	**283**	**13.7%**	0.34	**10.00**	**196.54**	**0.039**
101	850	277	32.6%	0.46	10.00	196.54	0.022
102	1,223	246	20.1%	0.38	10.00	196.54	0.026
Post Total	**2,073**	**523**	**25.2%**	0.41	**10.00**	**196.54**	**0.047**

100 Year Storm Design Parameters	
A=	4688.000
B=	17.000
C=	0.962
Intensity=	$A/(t+B)^C$
Q=	kCiA
k=	0.0028

Impervious Area C = 0.90
Pervious Area C = 0.25